PATENT ABSTRACTS OF JAPAN

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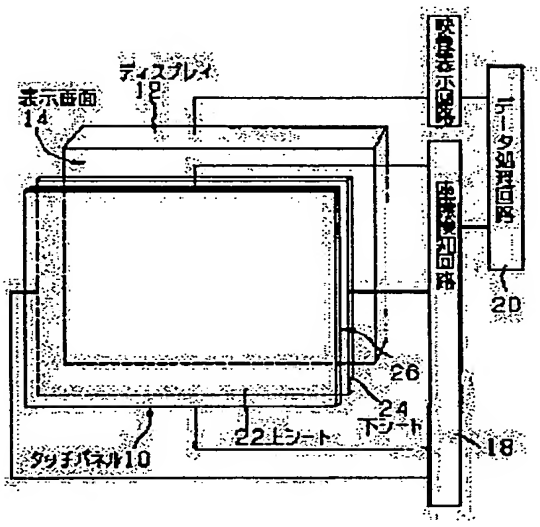
(54) DETECTION COORDINATE PROCESSING METHOD OF ANALOG TOUCH PANEL

(57)Abstract:

PROBLEM TO BE SOLVED: To make detectable more than one point being pressed at the same time and to make performable the corresponding data process without altering the hardware constitution by judging as one indication input position when a detected coordinate change quantity per unit time is less than a set value and as more than one position when larger.

SOLUTION: The analog touch panel 10 is arranged in contact with the display screen 14 of a display 12 like a liquid crystal display plate; when an arbitary coordinate position on the touch panel 10 is pressed and indicated by using an indicating means such as a finger tip, a coordinate detecting circuit 18 analyzes the coordinates corresponding to the depression point and a data processing circuit 20 performs the data processing operation according to the analytic result. Here, changes of the indication coordinates on the touch panel 10 are detected, e.g. intermittently at intervals of a unit time. Further, it is judged that one input position is indicated when the detected coordinate change quantity per unit time is less than the set value and more than one input position is indicated when larger.



DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the disposal method of the detected coordinate at the time of using an analog type touch panel as a data input means.
[0002]
[Description of the Prior Art]An analog-type touch panel is estranged and provided with the upper sheet 22 and the lower sheet 24 which usually consist of a resistance film of two sheets like drawing 1, and in a reference coordinate position. By carrying out the partial pressure of the reference voltage by which while was impressed to the resistance film like drawing 2 with the resistance film of another side, what takes the composition which detects the coordinates position of the X-axis and Y shaft orientations from the size of a detected voltage value is common.
[0003]
[Problem(s) to be Solved by the Invention]However, the above analog type touch panels had the inconvenience which takes those halfway points for an input coordinate position with the press directions of the two or more points being carried out on the principle not only at the ability only of one point to recognize coordinates directions but at the period.
[0004]Even if such [conventionally] this two-point aggressiveness that receives inconvenient is made, it has been processed as a failure. It is becoming impossible however, for the data input using this kind of touch panel to correspond, since an entry-of-data mistake like a factory is an operating environment accompanied by danger or many and unspecified use like the terminal of a bank is assumed only by carrying out processing made into the failure.
[0005]For example, like [when it is already operated by hand of one of the two, setting hand of one of the two on a touch panel or fingers other than the finger which is operating it touch a touch panel simultaneously], also in a general operation form which is usually carried out [whom or], such multipoint aggressiveness is made easily and an operation mistake generates it. as a result, the operation same with the operator being unable to do data input so that it may consider, and the cause not continuing being known -- not repeating -- it does not obtain but also becomes a remote cause which makes the distrust over generating and device itself of stress promote.
[0006]This invention cancels the above-mentioned inconvenience. The purpose is to provide the disposal method of the detected coordinate which makes possible data processing which detects and corresponds having pushed two or more points at the period, without changing the composition as hardware in an analog type touch panel.

[0007]
[Means for Solving the Problem]the former the touch panel 10 which enforces a data processing method concerning this invention indicates the fundamental composition to be to

drawing 1 roughly -- abbreviated -- it is a thing of an analog type of same composition, and it constitutes so that change of a reference coordinate over the analog type touch panel 10 may be intermittently detected for every unit time.

[0008]When the detected amount of coordinate changes per unit time is less than a preset value, while judging an indicating input position to be one, when exceeding a preset value, an indicating input position is judged to be plurality.

[0009]If a coordinate input to the analog type touch panel 10 occurs here, while performing the 1st data processing corresponding to the coordinates position, change of a reference coordinate is detected for every unit time. And when judging an indicating input position to be one, performing the 2nd data processing, when the amount of coordinate changes is less than a preset value, and exceeding a preset value, an indicating input position is judged to be plurality and the 3rd data processing is performed.

[0010]A coordinates position of 1st point A illustrated to drawing 3 acquired at the time of the 1st data processing that described above the 3rd above-mentioned data processing, It is preferred to perform data processing operation beforehand set up corresponding to two coordinates physical relationship with reference to a coordinates position of 2nd point B computed from a coordinates position and the amount of coordinate changes of the 1st point A.

[0011]If the 2nd above-mentioned data processing exceeds a predetermined number while repeat frequency is less than a predetermined number, and judging it to be the same coordinates position, it will be judged to be what a coordinate input position is moving continuously.

[0012]In the time of the 1st thru/or 3rd data processing above-mentioned again, When it is judged that it is outside coordinates area which dealt with the coordinates position as normal coordinates, and set it up beforehand if it is judged that an inputted coordinates position is in coordinates area set up beforehand, it is preferred to judge with an operation mistake and to perform error handling.

[0013]

[Effect of the Invention]This invention by being made to perform data processing which is different like the above corresponding to the variation per [in a detected coordinate] unit time, Coordinate input processing which was rich in change including data processing performed [having pushed two or more points at the period and] by detecting is enabled without changing the composition as hardware in an analog type touch panel in any way.

[0014]

[Embodiment of the Invention]Based on an example carried out to the personal computer device which it had as a data input means, explain the analog type touch panel 10 so that the data processing method which starts this invention below may be illustrated to drawing 1, but not only in this, Of course, it can carry out like abbreviation also to various kinds of data processing devices provided with the touch panel like the display for PLC.

[0015]While the touch panel 10 used for this invention being a thing of the analog type currently used from the former, and sticking on the display screen 14 of the display 12 like a liquid crystal display panel and arranging, If the press directions of the arbitrary coordinates position on the touch panel 10 are carried out like drawing 3 using the fingertip 16 or the same directing means, the coordinates corresponding to the pressing point will be analyzed by the coordinates detecting circuit 18, and data processing operation based on the analysis result will be performed by the data processing circuit 20.

[0016]With the display screen 14 and approximately identical shape, the analog-type touch panel 10 forms the very small gap 26, and allocates here the upper sheet 22 and the lower sheet 24 which consist of a resistance film which has predetermined resistance, If arbitrary one on the upper sheet 22 is pushed and the upper sheet 22 and the lower sheet 24 are contacted, both sheets are constituted so that it may electrically be connected via the

contact position 28 like drawing 2.

[0017]Where the reference voltage Vo is first impressed to the longitudinal direction in drawing 1 to the lower sheet 24 like drawing 2 (a), When the voltage of the contact position 28 is taken out via the upper sheet 22, the pressure value Vx, Since it is in agreement with the value which carried out the partial pressure of the reference voltage Vo impressed to the transverse direction of the lower sheet 24 in the contact position 28 with the upper sheet 22, the coordinates of the X axial direction which made the left brink of the lower sheet 24 the starting point, for example can be found by an operation from the transverse direction length of the division ratio of the reference voltage Vo and the detection voltage Vx, and the lower sheet 24.

[0018]While impressing the reference voltage Vo to the sliding direction in drawing 1 to the upper sheet 22 side about Y axial direction coordinates conversely like drawing 2 (b) with the case where it describes above, by taking out the detection voltage Vy from the lower sheet 24 side, For example, the coordinates of Y shaft orientations which made the margo inferior of the upper sheet 22 the starting point can be found by an operation.

[0019]By the way, if it is when a directions position is moved with the pressing state maintained after carrying out the press directions only of the one point as mentioned above, For example, as for a coordinate change, if detecting operation of the position coordinate above-mentioned for every unit time not more than 0.1 second or it is performed, change of the position coordinate detected for every unit time is small, and also it is common to cover many times continuously and to generate. Then, if it is in this example, when it is judged that the above-mentioned conditions were satisfied, it is judged as coordinates movement by 1 point instruction, and data processing corresponding to it is made to perform.

[0020]Next, the state where the press directions of the one point A were carried out, for example has been maintained like drawing 3 (a). If the press directions of the different coordinates position B like drawing 3 (b) are carried out, it will become a form where the upper sheet 22 and the lower sheet 24 are connected by standing in a row like drawing 4, between two-point A.B to which it pointed, The coordinates on the display screen 14 computed by the operation from the detection voltage Vx correspond to C point of being located in the approximately center on the straight line which connects two-point A-B, as a result of the reduction of resistance to which the reference voltage Vo is impressed.

[0021]Coordinates movement in the coordinates position C is performed in an instant from the 1st above-mentioned coordinates position A, without passing through intermediate coordinates, with the press instruction state of the touch panel 10 maintained. Then, since it will be judged that two on the touch panel 10 were pushed if movement of the detected coordinate exceeding the above preset values is checked, data processing corresponding to it is made to perform.

[0022]A coordinate change which was described above if it was when two points were pushed thoroughly at the period is not detected, but one point is pushed in two-point aggressiveness, and that judgment cannot be performed. Then, if it is in this example, while displaying the input permission area 30 where press directions of a switch figure like drawing 3, etc. are positively called for on the display screen 14, judge ****** [the detected coordinates / in the permission area 30], and perform data processing only corresponding to the case in the permission area 30, but. If it is outside the permission area 30, he is trying to warn an operator of an operation mistake by performing predetermined error handling.

[0023]It explains still in detail using the flow chart hereafter shown in drawing 5 and drawing 6 about the outline of the above-mentioned determining operation. It goes into the detection process of the 1st point which begins from step ST4, after one [performing a predetermined initialization action by step ST2 first and / step ST3 / a timer], if the detecting operation of the analog type touch panel 10 is started by step ST1 of drawing 5.

[0024]The repeating cycle in the detecting operation of a coordinates position is determined,

whenever it finishes counting the unit time set to 0.1 second or less than it, a signal is outputted, and a timer tells progress of unit time.

[0025]If progress of unit time is judged by step ST4, after resetting a timer by step ST5, when the existence of a coordinate input is judged in step ST6 and there is no input, it will return to step ST4 and the detecting operation of an input at a unit time interval will be repeated.

[0026]If a coordinate input is checked by step ST6, by acquiring applicable coordinates by step ST7, it will end and will move from the acquisition process of the 1st point to the 1st data processing step of step ST8.

[0027]The 1st data processing step performed by this step ST8, ****** [the coordinates directed by step ST10 / in the input permission area 30] is judged, and if a judgment is "YES", it will move to step ST11, and normal input process processing specified with applicable coordinates is performed so that drawing 6 (a) may explain the composition in detail. However, if the judgment of step ST10 is "NO", after moving to step ST12 and performing error handling, it moves to step ST13 of drawing 5.

[0028]Error handling performed in step ST12 of drawing 6 (a) here sends the error message of the purport that the input position is wrong, for example, and it may move from it to step ST13 of drawing 5, without asking for the check or carrying out data processing in any way. When an error is judged, it is preferred to constitute so that inputs including the input of the 2nd point which carries out the following may not be received until a pressing state is turned off.

[0029]After the coordinates acquisition process of the 2nd point of beginning from step ST13 of drawing 5 waits for progress of unit time by step ST13, it resets a timer by step ST14, and also detects the existence of data input by step ST15. Here, if judged, after that data input was lost resets a counter by step ST9, it will return to step ST4 and will repeat the 1st-point following detection processing. However, if judged, after that the input is still continuing acquires the coordinates by step ST16, it will compute the distance of coordinates with the 1st point in step ST17.

[0030]From this computed variation, when a coordinate change is not accepted in step ST18, it returns to step ST13 and the coordinates acquisition for every unit time is repeated. However, a coordinate change is accepted by step ST18, and also if it is judged that a coordinate change is less than the value set as about one duty of fingers in step ST19, the 2nd data processing in step ST20 will be performed, When exceeding a preset value, the 3rd data processing shown in step ST21 is performed.

[0031]After holding here the coordinates acquired in step ST22 as the 2nd data processing was data processing to the continuous movement of a reference coordinate and it was shown in drawing 6 (b) as a normal coordinate, one summing processing of the counter is carried out by step ST23. In step ST24, the count number of a counter judges whether the preset value which consists of a small number which is about two was exceeded.

[0032]Since the fingertip 16 to which it is pointing may have touched accidentally with two fingers which blurred on the touch panel 10 or adjoined each other when counted value was below a set number, it returns without doing anything. However, since an operator can judge that coordinates movement is carried out intentionally when movement of a reference coordinate can check continuously, although it is minute, it moves to step ST25 and continuous movement processing is performed.

[0033]On the other hand, the 3rd data processing shown in drawing 6 (c) is data processing in the case of pointing positively to two on the touch panel 10, and performing menu manipulation, and the coordinates of 2nd point B are computed in step ST26.

[0034]If it is when the press directions of two A and B are simultaneously carried out like drawing 3 (b), if it is in the analog touch panel 10 here, the mid-position C of two points is detected as a directions position. Then, coordinates [in / in the coordinates of the 1st point A / the point C after (X1, Y1), and movement] can calculate the coordinates (X2, Y2) of the

2nd point B by (X0+deltax, Y0+deltay), when movement magnitude is (delta x, delta y) in (X0, Y0).

[0035]By the way, while separating from normal operation area still like [special operation like the maintenance by a maintenance control person of carrying out two point aggressiveness intentionally and carrying out a control device is common, and] the four corners of a screen, the position which operation cannot carry out as easily as possible is chosen.

[0036]Then, in step ST27 of drawing 6 (c), it is judged whether a two-point input is permitted on the screen displayed now. If this judgment is "YES", the coordinates position of 1st point A and the 2nd point B, On the display screen 14, after judging by step ST28 whether it is inside of the permission area 32 for the two-point aggressiveness which is not specified and which was set up beforehand and checking that it is in the area 32 of relevance, in step ST29, data processing corresponding to predetermined two-point aggressiveness is performed.

[0037]However, when it was judged that two-point aggressiveness is not permitted by step ST27, after moving to step ST30 and performing predetermined error handling if it is judged that it is outside the permission area 32 in step ST28, it returns to step ST13 of drawing 5.

[Translation done.]